

# Multilevel “fish-vertebra” sign in a patient with idiopathic osteoporosis

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## Abstract

“Fish-vertebra” is an uncommon deformity of vertebral body shape, consisting of central depression of the superior and inferior surfaces of vertebral bodies. It is characteristic in idiopathic osteoporosis and can help in the differential diagnosis of other conditions, such as osteomalacia, hyperparathyroidism, sickle cell disease, Paget disease, and multiple myeloma.

## KEYWORDS

biconcave deformity, codfish vertebrae, fish-vertebra sign, idiopathic osteoporosis, teriparatide

## 1 | CASE PRESENTATION

A 46-year-old man with a low back pain for over a year who was initially treated with analgetics, modification on daily activities, and physical therapy protocols presented in our department. The patient was a manual worker, without prior traumatic medical experience and medication history. The pain had increased during the last 4 weeks without any remarkable improvement after a combination of analgetics and opioid drugs. His pain was more intense when bending forward and was relieved on recumbent position. Neurovascular examination was normal.

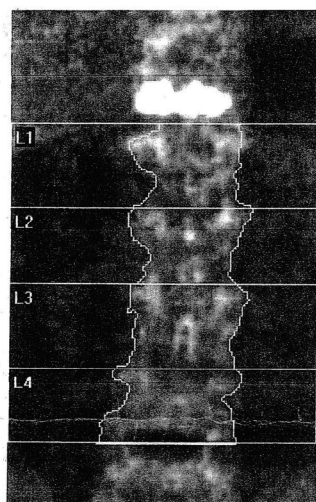
His blood test investigation at the admission site was normal. Thoracolumbar plain radiograph revealed a symmetrical biconcave deformity of the vertebral bodies from T12 to L5. Magnetic resonance imaging (MRI) of the

thoracolumbosacral spine confirmed the “fish-vertebra” sign of the lumbar vertebral bodies (Figure 1). Dual-energy X-ray absorptiometry (DEXA) revealed a T-score of  $-3.9$  at the spine (Figure 2). The patient underwent kyphoplasty, and he went home the following day. Biopsies from vertebral bodies were negative for malignancy, and the diagnosis of idiopathic osteoporosis was made. The patient was treated with teriparatide. After 1-year follow-up, the patient was almost pain-free and had returned back to his work.

Our case describes the “fish-vertebra” in a patient with idiopathic osteoporosis. Detailed history, clinical examination, and radiological imaging are mandatory to establish diagnosis and facilitate differential diagnosis with various conditions, such as osteoporosis, osteomalacia, hyperparathyroidism, Paget disease, sickle cell disease, multiple myeloma, and systemic lupus erythematosus.<sup>1,2</sup>



**FIGURE 1** Sagittal T2-weighted MRI of the thoracolumbar spine resembling the characteristic “fish-vertebra” sign. All the vertebral bodies from T12 to L5 show the biconcave vertebral body deformity of their endplates, with different signal intensities of their bone marrow and loss of more than 30% of the vertebral height



**Scan Information:**

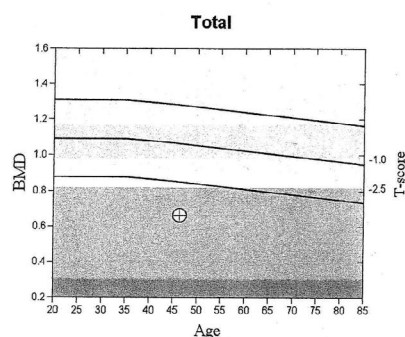
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 Scan Type: x Lumbar Spine  
 Analysis: 01 June 2020 13:35 Version 13.1.2:7  
 Spine (auto low density)  
 Operator:  
 Model: Discovery C (S/N 81334)  
 Comment:

**FIGURE 2** Dual-energy X-ray absorptiometry scan report of a 46-y-old patient showing osteoporosis and indicating increased risk of fracture

**DXA Results Summary:**

Region	Area (cm <sup>2</sup> )	BMC (g)	BMD (g/cm <sup>3</sup> )	T-score	PR (%)	Z-score	AM (%)
L1	13.64	9.68	0.710	-3.3	66	-3.1	68
L2	13.06	9.46	0.724	-3.4	66	-3.1	68
L3	15.26	10.12	0.663	-4.0	60	-3.7	62
L4	15.79	9.05	0.573	-4.7	53	-4.4	54
<b>Total</b>	<b>57.74</b>	<b>38.30</b>	<b>0.663</b>	<b>-3.9</b>	<b>61</b>	<b>-3.6</b>	<b>62</b>

Total BMD CV 1.0%, ACF = 1.053, BCF = 1.032, TII = 9.201  
 WHO Classification: Osteoporosis  
 Fracture Risk: High



**Comment:**

## CONFLICT OF INTEREST

No potential conflict of interest was reported by the authors.

## AUTHOR CONTRIBUTION

AVV, IV, NV, and AM: designed the study, wrote the draft, and approved the manuscript for submission.

## ETHICAL APPROVAL

Written informed consent was obtained from the patient for the publication of this clinical image.

## DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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